



PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improved Screw Cap Tightening Machine

WE, ALBERT FILLERS AND ENGINEERING COMPANY LIMITED, a British Company, of Wharf Road, Ponders End, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for tightening screw caps on bottles, cans or other containers (hereinafter called containers).

The invention provides such an apparatus in which a capping head is movable to and from a cap-tightening station and is rotatable to screw a cap on a container and which comprises a chuck collet having a tapered recess, and chuck jaws which fit in the tapered recess in the collet and are spring loaded towards an open position, the said jaws having tapered surfaces which co-operate with the tapered recess so that, after the jaws have been moved over the cap to be tightened, movement of the chuck towards the container closes the jaws on the cap while movement away from the container opens the jaws.

The tightening apparatus provided by the invention can be fitted in either a single head or a rotatable multiple head capping machine of either the straight line or rotary type.

An apparatus according to the present invention for tightening screw caps previously fitted on a container is illustrated in the accompanying drawing which is a sectional elevation.

The apparatus illustrated comprises a screwing or capping head mounted on a vertical shaft 1 which is rotatable in bearings in a head bracket 2. This vertical shaft 1 is rotated by a horizontal drive shaft 3 which acts through a drive pinion 4 and drive gear 5 and a friction clutch 6 including a spring 7 the force of which is adjustable by means of an adjusting nut 8 so that the pressure exerted by the clutch 6 on the vertical shaft 1 can be varied to adjust the degree of tightness by which the caps are screwed on the containers.

A chuck collet 9 is mounted on the lower end of the vertical shaft 1 and has a tapered recess

10 which opens downwards and has its smaller end at the top.

An axial blind bore 11 in the lower end of the vertical shaft 1 opens into the recess 10. A chuck guide pin 12 is slidable in the blind bore 11 and supports a number of chuck jaws 13 having outer surfaces which are inclined to correspond with the tapered surface of the recess 10 in the collet 9 so that they can slide on that surface of the recess and having inner surfaces which are shaped to suit the caps being screwed on the containers. Coil springs 14 are fitted in horizontal bores 15 in the jaws 13 so that the jaws are spring-loaded outwards *i.e.* towards the open position of the chuck. If the jaws 13 are moved into the recess 10, their sloping surfaces slide on the tapered surface of the recess so that the jaws are closed together against the action of the various coil springs 14.

The screwing or capping head is caused to move downwards towards or to rise away from a cap-tightening station in any suitable manner. When the jaws 13 move downwards, they first fit loosely over the cap to be screwed; continued downward movement of the head then causes the collet 9 to move with respect to the jaws 13 with the result that the jaws are tightened on the cap. When the screwing operation has been completed, the head rises under the action of a head lifter 16 and during the initial part of such movement the collet 9 moves upwards with respect to the jaws 13 with the result that the jaws open to release the cap.

If an apparatus according to the present invention is applied to a single head machine, containers with caps loosely fitted on them are advanced in turn beneath the capping head on an intermittently rotatable star wheel or other carrier which remains stationary while the cap is tightened by rotation of the chuck.

When the invention is applied to a multiple head machine of the rotary type, containers are advanced on a rotatable turret arranged beneath a number of capping heads. The containers are moved on and off the turret by means of rotatable star wheels.

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What we claim is:—

1. An apparatus for tightening screw caps on bottles, cans or other containers in which a capping head is movable to and from a cap-tightening station and is rotatable to screw a cap on a container comprising a chuck collar having a tapered recess, and chuck jaws which fit in the tapered recess in the collet and are spring loaded towards an open position, the said jaws having tapered surfaces which co-operate with the tapered recess so that, after the jaws have been moved over the cap to be tightened, movement of the chuck towards the container closes the jaws on the cap while movement away from the container opens the jaws.
2. An apparatus as claimed in claim 1 wherein

the chuck collar is mounted on a shaft driven through a friction clutch which is adjustable to permit the pressure applied by the clutch to the shaft to be varied whereby the tightness by which the caps are secured on the containers can be varied.

3. An apparatus for tightening screw caps on bottles, cans or other containers substantially as described with reference to the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improved Screw Cap Tightening Machine

We, ALBRO FILLERS AND ENGINEERING COMPANY LIMITED, a British Company, of Wharf Road, Ponders End, Middlesex, do hereby declare this invention to be described in the following statement:—

This invention relates to apparatus for tightening screw caps on bottles, cans or other containers (hereinafter called containers).

According to the invention, such an apparatus comprises a capping head which is rotatable to screw a cap on a container, means for moving the head to and from a cap-tightening station, a chuck collar having a tapered recess, and chuck jaws which fit in the tapered recess in the collet and are spring loaded towards an open position, the said jaws having tapered surfaces which co-operate with the tapered recess so that, after the jaws have been moved over the cap to be tightened, movement of the chuck towards the container closes the jaws on the cap while movement away from the container opens the jaws.

The tightening apparatus provided by the invention can be fitted in either a single head or a rotatable multiple head capping machines of either the straight line or rotary type.

In a preferred embodiment of the invention, an apparatus for tightening screw caps previously fitted on a container, comprises a screwing or capping head mounted on a vertical shaft which is rotatable in bearings in a head bracket. This vertical shaft is rotated by a drive shaft which acts through a friction clutch including a spring the force of which is adjustable so that the pressure exerted by the clutch on the vertical shaft can be varied to adjust the degree of tightness by which the caps are screwed on the containers.

A chuck collar is mounted on the lower end of the vertical shaft and has a tapered recess which opens downwards: the smaller end of the recess is at the top. An axial blind bore in the

lower end of the vertical shaft opens into the recess. A chuck guide pin is slidable in the blind bore and supports a number of chuck jaws having outer surfaces which are inclined to correspond with the tapered surface of the recess in the collet so that they can slide on that surface of the recess and having inner surfaces which are shaped to suit the caps being screwed on the containers. Coil springs are fitted in horizontal bores in the jaws so that the jaws are spring-loaded outwards *i.e.* towards the open position of the chuck. If the jaws are moved into the recess, their sloping surfaces slide on the tapered surface of the recess so that the jaws are closed together against the action of the various coil springs.

The screwing or capping head is caused to move downwards towards or to rise away from a cap-tightening station in any suitable manner. When the jaws move downwards, they first fit loosely over the cap to be screwed; continued downward movement of the head then causes the collet to move with respect to the jaws with the result that the jaws are tightened on the cap. When the screwing operation has been completed, the head rises and during the initial part of such movement the collet moves upwards with respect to the jaws with the result that the jaws open to release the cap.

In an apparatus according to the present invention is applied to a single head machine, containers with caps loosely fitted on them are advanced in turn beneath the capping head on an intermittently rotatable star wheel or other carrier which remains stationary while the cap is tightened by rotation of the chuck.

When the invention is applied to a multiple head machine of the rotary type, containers are advanced on a rotatable turret arranged beneath a number of capping heads. The containers are moved on and off the turret by means of rotatable star wheels.

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